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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,267

06/23/2006

Ryoichi Okuyama

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EXAMINER

WIESE, NOAH S

ART UNIT

PAPER NUMBER

1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,267	Applicant(s) OKUYAMA ET AL.	
	Examiner NOAH S. WIESE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23,27,28,32,33,39,40,43,47,52 and 55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11,13-23,27,28,32,33,39,40,43,47,52 and 55 is/are rejected.
- 7) ☒ Claim(s) 12,43 and 47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/23/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

1. The claims 1-23, 27, 28, 32, 33, 39, 40, 43, 47, 52 and 55 are pending and presented for the examination.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/JP04/19665.

Information Disclosure Statement (IDS)

3. The information disclosure statement (IDS) was submitted on 06/23/2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of the 1449 herewith.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claims 43 and 47 recite the limitation "the catalyst" in lines 3 and 2 of the claims, respectively. The claims refer to the catalyst of claim 11. There is insufficient antecedent basis for this limitation in the claims because claim 11 does not discuss a catalyst.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-8, 11, 13-14, 39-40, 43, and 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Cropley et al (US 6811905).

Regarding **claim 1**, Cropley et al teaches a methanol fuel cell that can be used in an alternative method to produce hydrogen (see claim 1 and column 15, lines 24-35). The fuel cell comprises a membrane with electrodes on opposing sides, wherein a methanol and water fuel mixture is introduced to one electrode and oxygen (the oxidizing agent) is introduced to the opposing electrode (see Figure 1). Cropley et al teaches that the hydrogen is produced at the cathode, which is equivalent to the fuel electrode of instant claims (see column 15, lines 24-27). Thus, Cropley teaches a fuel cell setup that is equivalent to that of instant claims and additionally teaches that the method can be used for producing hydrogen. Therefore, the limitations of claim 1 are anticipated by Cropley et al.

Regarding **claims 2-4**, because, as discussed above, Cropley teaches a fuel cell apparatus that is equivalent to the hydrogen generator of instant claims, and because the method steps of providing fuel and oxygen to opposing electrodes are equivalent, it

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would inherently be possible to perform the Cropley method under open-circuit conditions, while withdrawing electric energy, or while providing electric energy from outside.

Regarding **claims 5-6**, Cropley teaches that the organic compound in the fuel is methanol (see claim 31).

Regarding **claims 7-8**, Cropley teaches that the oxidizing agent is oxygen-containing gas (see Figure 1).

Regarding **claim 11**, as discussed above for claim 1, Cropley et al teaches a methanol fuel cell that can be used in an alternative method to produce hydrogen. The fuel cell comprises a membrane with electrodes on opposing sides, wherein a methanol and water fuel mixture is introduced to one electrode and oxygen is introduced to the opposing electrode. Cropley et al teaches that the hydrogen is produced at the cathode, which is equivalent to the fuel electrode of instant claims (see column 15, lines 24-27).

Regarding **claim 13**, Cropley teaches that the apparatus can be used for producing electrical energy, indicating a means for withdrawing electric energy from the cell. In this configuration the electrode receiving the fuel is the anode (see Abstract).

Regarding **claim 14**, Cropley teaches that the hydrogen production method can be performed by providing an electrical current to the cell, indicating a means for providing electric energy from outside (see column 15, lines 29-35). In this configuration the electrode receiving the fuel would function as the cathode.

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Regarding **claims 39-40**, Cropley teaches that the membrane is a proton conducting solid electrolyte membrane (see claim 1), and preferably, a perfluorosulfonic acid membrane (see column 10, lines 40-43).

Regarding **claim 43**, Cropley teaches that the anode (fuel electrode) comprises a platinum-ruthenium film (see column 4, lines 20-23). The film can be dispersed a support such as carbon (see column 8, lines 57-62).

Regarding **claim 47**, Cropley teaches that the cathode (oxidizing electrode) comprises a platinum film that can be supported on carbon powder (see column 4, lines 24-25 and column 8, lines 57-62).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cropley et al (US 6811905).

Regarding **claims 9-10**, Cropley et al teaches that oxidants such as hydrogen peroxide can be used as alternative fuels in methanol fuel cells of the same type as that of the invention (see column 2, lines 15-16). This teaching would motivate one of ordinary skill to experiment with hydrogen peroxide as the oxidant, and would lead to the replacement of oxygen with the equivalent oxidant hydrogen peroxide in order to achieve equivalent and expected results. Thus, claims 9-10 are obvious and not patentably distinct over the prior art of record.

11. Claims 1-18, 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi et al (US 5599638) in view of Narayanan et al (US 6299744).

Regarding **claim 11**, Surampudi et al teaches a fuel cell apparatus comprising an anode, a cathode, a solid polymer hydrogen ion conductor membrane, means for circulating an organic fuel past the anode and means for flowing oxygen past the cathode (see claim 1). The cathode and anode are on opposite surfaces of the membrane (see Figure 1). Water is also supplied to the anode (see Abstract). Thus, the Surampudi fuel cell is an equivalent system to that of claim 11, except that the system does not teach a means for removing hydrogen-containing gas from the fuel electrode. However, it would have been obvious to modify Surampudi in view of Narayanan et al in order to add this means and use the Surampudi system to generate hydrogen.

This is because Narayanan teaches a method of producing hydrogen from a fuel such as methanol using a membrane and electrodes in a system very similar to that of

Surampudi (see Abstract and Figure 1). The system comprises a cathode and anode on opposite sides of a membrane, with the fuel contacting one electrode to produce hydrogen. The Narayanan system would show one of ordinary skill that hydrogen could be produced from a fuel cell apparatus that is similar to the Narayanan, such as that taught by Surampudi. This would be done by adding a means of collecting hydrogen to the Narayanan fuel cell, which would collect the hydrogen produced by the Narayanan process, which is equivalent to that of instant claims. One of ordinary skill would have been motivated to make this modification because Surampudi teaches that hydrogen production can be performed with an apparatus similar to that of a methanol fuel cell, and the production of hydrogen from a common apparatus such as a fuel cell would be advantageous. One would have expected reasonable success in the modification because of the above mentioned similarities in the apparatuses. Therefore, claim 11 is obvious and not patentably distinct over the prior art of record.

Regarding **claim 13**, Surampudi et al teaches that the apparatus can be used for producing electrical energy, indicating a means for withdrawing electric energy from the cell. In this configuration the electrode receiving the fuel is the anode (see Abstract).

Regarding **claim 14**, Narayanan teaches that a current is placed across the electrodes, with the fuel-receiving electrode serving as the cathode (see Figure 1).

Regarding **claims 15-17 and 19**, Narayanan teaches that the voltage between the electrodes is about 400 mV (see column 2, lines 2-4).

Regarding **claim 20**, Narayanan teaches that the voltage between the electrodes is controlled by varying the amount of voltage applied (see Figure 2).

Regarding **claim 21**, Narayanan teaches that the voltage between the electrodes controls the volume of hydrogen produced (see columns 9-10, lines 67-6).

Regarding **claim 22**, Surampudi teaches that the oxidant plays a key role in the reaction in the fuel cell that causes the voltage difference between the electrodes (see column 7, lines 3-13). Thus it would have been obvious to one of ordinary skill in the art that varying one of the reaction components (the oxidant) would adjust the voltage between the electrodes.

Regarding **claim 23**, Surampudi teaches that the oxidant can be oxygen or air, and that these oxidants lead to different voltages between the electrodes (see Figure 4). Thus, Surampudi teaches that the concentration of the oxidant can be used to control this voltage.

Regarding **claim 27**, Surampudi teaches that the fuel mixture plays a key role in the reaction in the fuel cell that causes the voltage difference between the electrodes, and further teaches that the flow rate (supply volume provided) can be varied (see column 8, lines 4-13). Thus it would have been obvious to one of ordinary skill in the art that varying the fuel supply would adjust the voltage between the electrodes.

Regarding **claim 28**, Surampudi teaches that the voltage can be controlled by varying the fuel mixture concentration (see claim 48).

Regarding **claims 32-33**, Narayanan teaches that the hydrogen producing system produces hydrogen at a temperature of between 5°C and 120°C (see column 9, lines 58-60). Per MPEP 2144.05, in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists.

Regarding **claim 40**, Narayanan teaches that the membrane is a proton conducting solid electrolyte membrane (see column 2, lines 10-15). In particular, Narayanan teaches that the membrane is a co-polymer including perfluorovinylether sulfonic acid, which is a perfluorocarbon sulfonate-based electrolyte (see column 4, lines 11-14).

Regarding **claim 43**, Narayanan teaches that the anode (fuel electrode) comprises a platinum-ruthenium film supported on carbon (see column 5, lines 3-5).

Regarding **claim 47**, Narayanan teaches that the cathode (oxidizing electrode) comprises a platinum or palladium supported on carbon (see column 7, lines 2-8).

Regarding **claim 52**, Narayanan teaches a means for circulating the fuel mixture (see column 3, lines 1-3).

Regarding **claim 1**, when the fuel cell apparatus taught by Surampudi is modified in view of Narayanan as discussed above, its use to produce hydrogen would constitute a method meeting all of the limitations of claim 1. Surampudi teaches that a fuel-water mixture is introduced to an anode that is on an opposite side of a membrane as a cathode, to which oxygen is introduced. These method steps are equivalent to those of claim 1, and thus when a hydrogen removal means is added, the method would meet all of the limitations of the claim. Thus, claim 1 is obvious and not patentably distinct over the prior art of record.

Regarding **claims 2-4**, because, as discussed above, Surampudi in view of Narayanan teaches a fuel cell apparatus that is equivalent to the hydrogen generator of instant claims, and because the method steps of providing fuel and oxygen to opposing

electrodes are equivalent, it would inherently be possible to perform the method under open-circuit conditions, while withdrawing electric energy, or while providing electric energy from outside.

Regarding **claims 5-6**, Surampudi and Narayanan teach that the organic compound in the fuel is methanol.

Regarding **claims 7-8**, Surampudi teaches that the oxidizing agent is oxygen-containing gas.

12. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi et al (US 5599638) in view of Narayanan et al (US 6299744) and Narayanan et al (US 6485851).

Regarding **claims 9-10**, the claims differ from Surampudi in view of Narayanan ('744) because the patents do not teach that the oxidizing agent is liquid hydrogen peroxide. However, it would have been obvious to modify Surampudi in further view of Narayanan ('851) because '851 teaches that liquid hydrogen peroxide can be used as the oxidizing agent in the same type of methanol fuel cell as is taught by Surampudi and '744 (see Abstract). One would have been motivated to make this substitution because '851 teaches that hydrogen peroxide is a good, needed replacement for oxygen used in typical fuel cells (see column 1, lines 62-65). One would have expected reasonable success in the modification because '851 teaches the same type of methanol fuel cell as is taught by Surampudi. Therefore, claims 9-10 are obvious and not patentably distinct over the prior art of record.

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13. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Surampudi et al (US 5599638) in view of Narayanan et al (US 6299744) and Quang et al (US 4840783).

Regarding **claim 55**, the claim differs from Surampudi in view of Narayanan because the patents do not teach a carbon dioxide absorbing portion. However, it would have been obvious to modify Surampudi in view of Narayanan and in further view of Quang et al because Quang teaches a method of producing hydrogen from methanol involving an advantageous carbon dioxide absorbing portion (see claim 18). One of ordinary skill would have been motivated to include such an absorbing portion because doing so would result in a product gas with higher hydrogen purity. One would have expected reasonable success in the modification because Narayanan and Quang are drawn to similar methods of producing hydrogen from methanol. Therefore, claim 55 is obvious and not patentably distinct over the prior art of record.

Allowable Subject Matter

14. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The claim is allowable because Cropley, Surampudi, and Narayanan both teach that a voltage is used across the electrodes, and there is no teaching or suggestion for using the system or method without this voltage source.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

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unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 11-23, 27-28, 43, 47, and 55 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-39 of copending Application No. 11/794357. Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending application's claims are drawn to a hydrogen generation system comprising the same methods and elements as those of instant claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

17. No claim is allowed.

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Noah S. Wiese whose telephone number is 571-270-3596. The examiner can normally be reached on Monday-Friday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793

Noah Wiese
July 9th, 2008
AU 1793